

EXERCISES

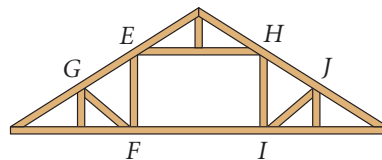
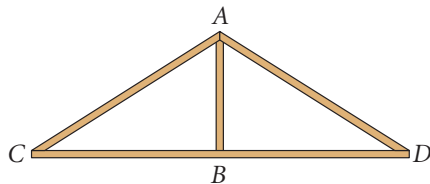
For more practice, see *Extra Practice*.

Practice and Problem Solving

A Practice by Example

Example 1
(page 180)

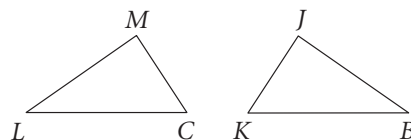
1. **Building** Builders use the King Post truss, below left, for the top of a simple structure. In this truss, $\triangle ABC \cong \triangle ABD$. List the congruent corresponding parts.



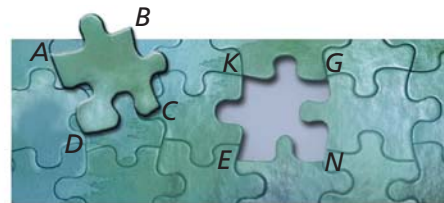
2. The Attic Frame truss, above right, provides open space in the center for storage. In this truss, $\triangle EFG \cong \triangle HIJ$. List the congruent corresponding parts.

$\triangle LMC \cong \triangle BJK$. Complete the congruence statements.

- | | |
|-----------------------------|-----------------------------|
| 3. $\overline{LC} \cong ?$ | 4. $\overline{KJ} \cong ?$ |
| 5. $\overline{JB} \cong ?$ | 6. $\angle L \cong ?$ |
| 7. $\angle K \cong ?$ | 8. $\angle M \cong ?$ |
| 9. $\triangle CML \cong ?$ | 10. $\triangle KBJ \cong ?$ |
| 11. $\triangle MLC \cong ?$ | 12. $\triangle JKB \cong ?$ |



13. The last piece of the jigsaw puzzle must be put into place. Name the corners that correspond to corners A, B, C, and D.

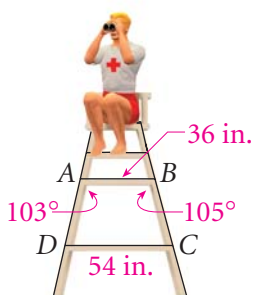


$POLY \cong SIDE$. List each of the following.

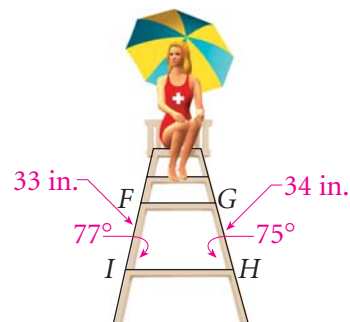
14. four pairs of congruent sides 15. four pairs of congruent angles

Example 2
(page 181)

In the two lifeguard chairs, $ABCD \cong FGHI$. Find the measure of the angle or the length of the side.



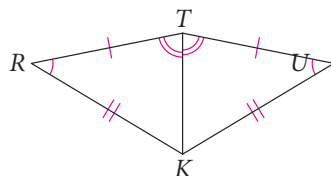
- | | |
|---------------------|---------------------|
| 16. \overline{AD} | 17. \overline{HI} |
| 18. $\angle FGH$ | 19. $\angle ADC$ |
| 20. \overline{FG} | 21. \overline{BC} |
| 22. $\angle DCB$ | 23. $\angle IFG$ |



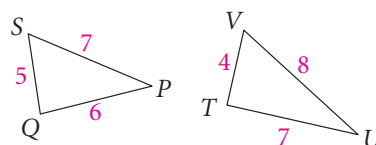
Example 3
(page 181)

Developing Proof In Exercises 24–27, can you conclude the figures are congruent? Justify each answer.

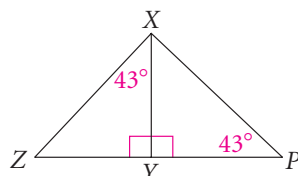
24. $\triangle TRK$ and $\triangle TUK$



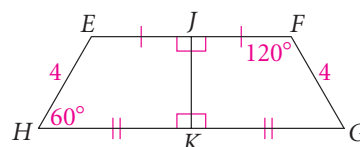
25. $\triangle SPQ$ and $\triangle TUV$



26. $\triangle XYZ$ and $\triangle XYP$



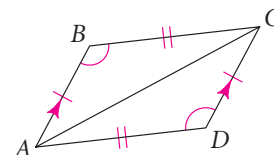
27. $HEJK$ and $GFJK$



Example 4
(page 182)

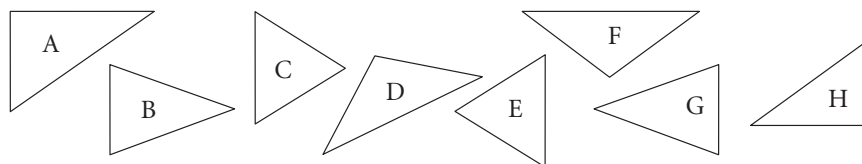
28. **Developing Proof** Use the information given in the diagram. Tell why each statement is true.

- $\overline{AB} \parallel \overline{DC}$
- $\angle CAB \cong \angle ACD$
- $\angle B \cong \angle D$
- $\angle BCA \cong \angle DAC$
- $\overline{AC} \cong \overline{AC}$
- $\overline{AB} \cong \overline{DC}, \overline{BC} \cong \overline{AD}$
- $\triangle ABC \cong \triangle CDA$



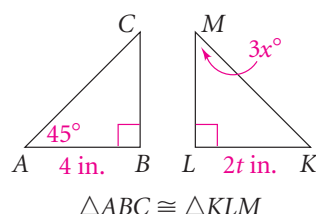
B Apply Your Skills

29. Identify the pairs of triangles that appear to be congruent.



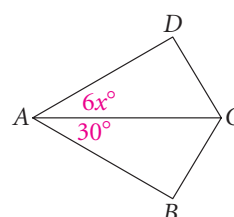
x² Algebra Find the values of the variables.

30.



$$\triangle ABC \cong \triangle KLM$$

31.



$$\triangle ACD \cong \triangle ACB$$

x² Algebra $\triangle ABC \cong \triangle DEF$. Find the measures of the given angles or the lengths of the given sides.

32. $m\angle A = x + 10, m\angle D = 2x$

33. $m\angle B = 3y, m\angle E = 21$

34. $BC = 3z + 2, EF = z + 6$

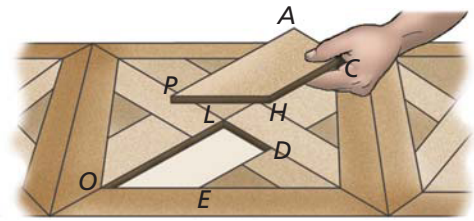
35. $AC = 7a + 5, DF = 5a + 9$



Need Help?

To review the Triangle Angle-Sum Theorem, go to Lesson 3-3.

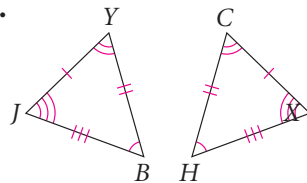
36. **Parquet Floor** Explain why it is important that $PACH \cong OLDE$.
37. **Sports Cards** The 225 cards in Tracy's sports card collection are rectangles of three different sizes. Describe how Tracy could quickly sort the cards.



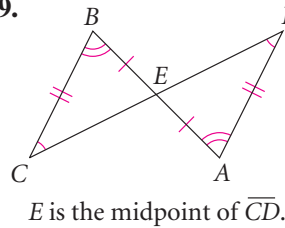
Exercise 36

Write a congruence statement for each pair of triangles.

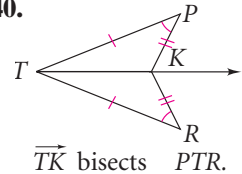
38.



39.

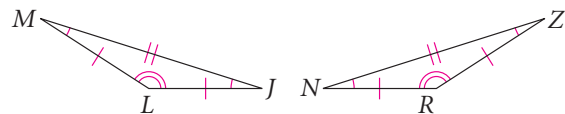


40.



41. Complete in two different ways:

$$\triangle JLM \cong \underline{\hspace{1cm}} ?$$



42. **Writing** Die-cast toys are a popular collector's item. Explain why the two die-cast toys that Pearl is studying at the left have congruent shapes.

43. **Open-Ended** Write a congruence statement for two triangles. List the congruent sides and angles.

44. **Developing Proof** Use the information given in the diagram. Tell why each statement is true.

a. $\overline{PR} \parallel \overline{TQ}$

b. $\angle PRS \cong \angle QTS$

c. $\angle RPS \cong \angle TQS$

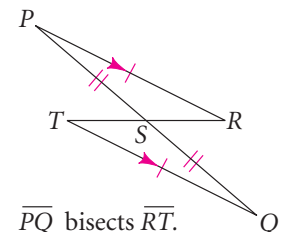
d. $\angle PSR \cong \angle QST$

e. $\overline{PR} \cong \overline{QT}, \overline{PS} \cong \overline{QS}$

f. \overline{PQ} bisects \overline{RT} .

g. $\overline{RS} \cong \overline{TS}$

h. $\triangle PRS \cong \triangle QTS$



45. **Developing Proof** If two angles of one triangle are congruent to two angles of another triangle, then the third angles are congruent (Theorem 4-1). Use algebra and the Triangle Angle-Sum Theorem to explain why this must be so.



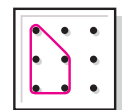
Challenge

Coordinate Geometry Vertices of $\triangle GHJ$ are $G(-2, -1)$, $H(-2, 3)$, and $J(1, 3)$.

46. $\triangle KLM \cong \triangle GHJ$. Find KL , LM , and KM .

47. $\triangle KLM \cong \triangle GHJ$. If L and M have coordinates $L(3, -3)$ and $M(6, -3)$, how many pairs of coordinates are possible for K ? Find one such pair.

48. a. How many quadrilaterals (convex and concave) with different shapes or sizes can you make on a three-by-three geoboard? One is shown at the right.
b. How many quadrilaterals of each type are there?



Exercise 42



Standardized Test Prep

Gridded Response

Use the diagrams at the right for Exercises 49–51.

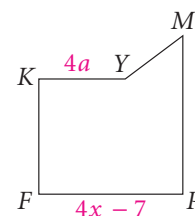
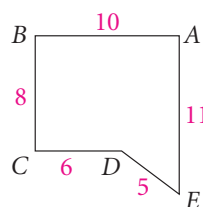
$$ABCDE \cong PFKYM$$

49. What is the value of a ?

50. What is the value of x ?

51. What is the perimeter of $PFKYM$?

52. $\triangle HLN \cong \triangle GST$, $m\angle H = 66$, and $m\angle S = 42$. What is $m\angle T$?



Take It to the NET

Online lesson quiz at
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Mixed Review

Lesson 3-7

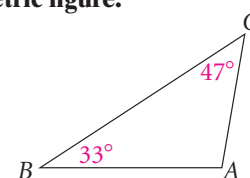
Constructions For Exercises 53 and 54, construct the geometric figure.

53. a square

54. a rectangle whose length is twice its width

Lesson 3-3

55. Find $m\angle A$ in the figure at the right.



Exercise 55

Lesson 2-4

Use the given property to complete each statement.

56. Symmetric Property of Equality

If $PQ = RS$, then $\underline{\hspace{1cm}}$.

57. Reflexive Property of Congruence

$\angle 1 \cong \underline{\hspace{1cm}}$

58. Addition Property of Equality

If $m\angle A - 4 = 8$, then $m\angle A = \underline{\hspace{1cm}}$.

59. Transitive Property of Congruence

If $\overline{AB} \cong \overline{DE}$ and $\overline{DE} \cong \overline{GH}$, then $\underline{\hspace{1cm}}$.

Geometry at Work

Die Casting

Two centuries ago, people manufactured articles by hand. Each article produced was slightly different from every other. In 1800, inventor Eli Whitney recognized that he could speed up manufacturing by using congruent parts. Whitney made a die, or mold, for each part of a musket he was producing for the U.S. Army. This allowed workers to rapidly cast the parts and assemble them into standard-sized muskets. It ushered in the era of mass production.

Today, die makers are highly skilled industrial workers who shape dies out of metal, plastic, rubber, and other materials. Machines create and assemble the congruent die-cast parts into standard-sized objects, like the die-cast toy cars at the left. Other workers supply a final inspection and skilled hand finishing.



Take It to the NET For more information about die casting, go to www.PHSchool.com.

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